7.2)

$A=\pi r^2$

$$\int_a^b f(x)\,dx = \lim_{\substack{\cancel{n\to\infty} \\ \max(\Delta_k)\to 0}} \sum_{k=1}^{n} \underbrace{f(x_k^*)\,\Delta x_k}_{\text{"y-ish"} \cdot \text{"x-ish"}}$$

not nec. 0   0

$$\sum \underbrace{f(x_k^*)}_{A=\pi r^2}\,\underbrace{\Delta x_k}_{h}$$

volume of washers

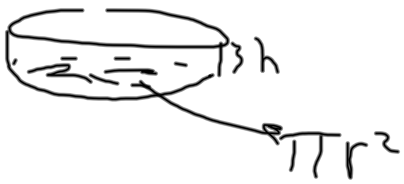
$$\int_a^b f(x)\,dx = \lim_{\substack{\cancel{n\to\infty} \\ (\max \Delta x_k \to 0)}} \sum_{k=1}^{n} f(x_k^*)\,\Delta x_k$$

summation

$$f(x_k^*) \cdot (\Delta x_k)$$

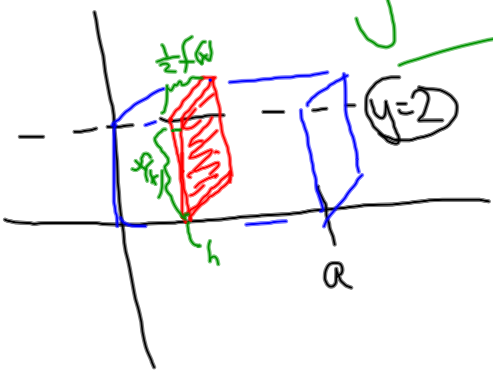
$f(x_k^*)$: does not go to zero

Δx_k: 0



$$\int_a^b f(x)\,dx = \lim_{\max \Delta x \to 0} \sum_{k=1}^{n} f(x_k^*)\Delta x_k$$

summation of a product of Two factors, one of which goes to zero.



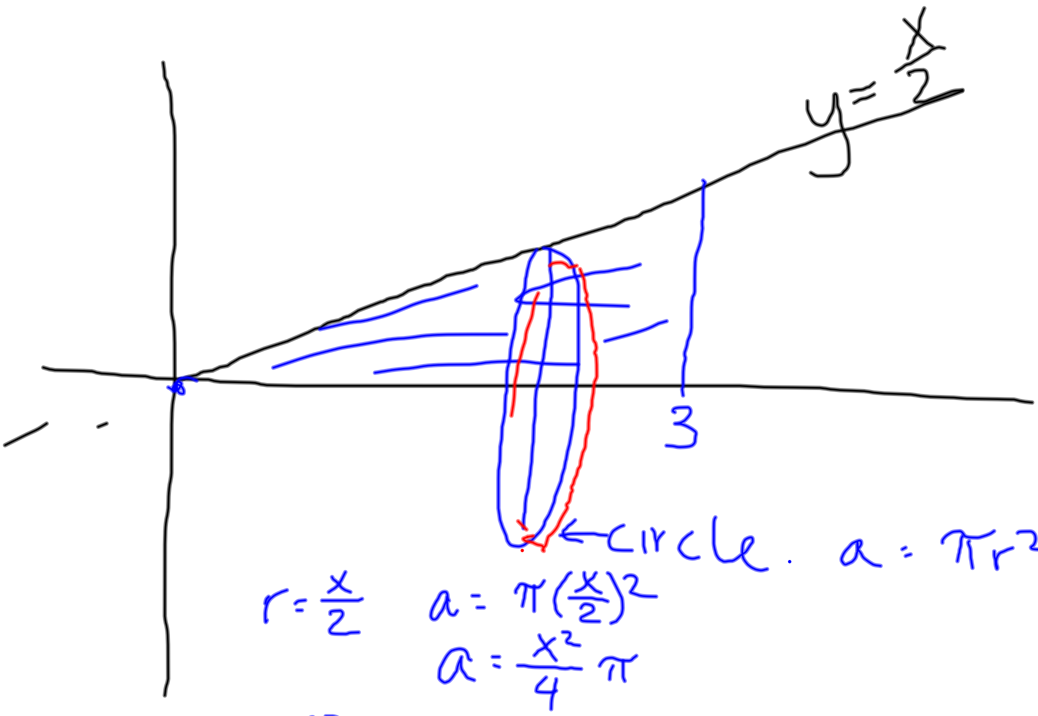
Volume of slice.

$$(2 \cdot 1)\,h$$

$h \to 0$

$$\int_0^a 2\,dx$$

$$= 2x\Big|_0^a = 2a - 2(0) = 2a$$



$a = \pi r^2$

$r = \frac{x}{2}$ $a = \pi\left(\frac{x}{2}\right)^2$

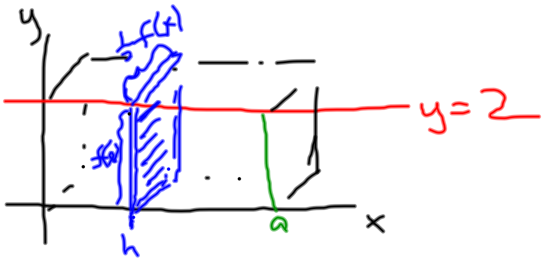
$a = \frac{x^2}{4}\pi$

$$\int_0^3 \frac{x^2}{4}\pi$$

$$\left.\frac{x^3\pi}{12}\right|_0^3 = \left.\begin{matrix}\frac{(3)^3\pi}{12} \\ -\frac{0^3\pi}{12}\end{matrix}\right\} = \frac{27\pi}{12} = \frac{9\pi}{4}$$

$$\int_a^b f(x)\,dx = \lim_{\max \Delta x_k \to 0} \underbrace{\sum_{k=1}^{n} f(x_k^*)\,\Delta x_k}$$

Summation of a product of two factors, ONE of which goes to zero

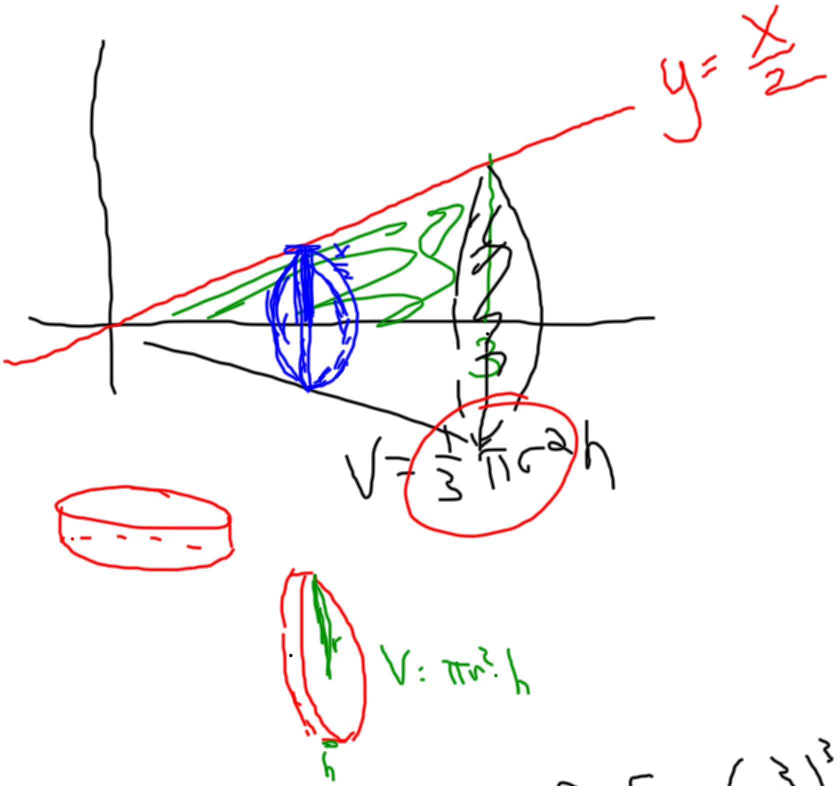


Volume of the slice (or sliver)

$$V = f(x) \cdot \tfrac{1}{2} f(x) \cdot h$$
$$= 2 \cdot \tfrac{1}{2}(2) \cdot h = 2h$$

$$V_{\text{entire}} = \int_0^a 2\,dx$$

$$= 2x \Big|_0^a = 2a - 2(0) = 2a$$



$$\int_0^3 \pi\, r^2\, dx$$

$$\int_0^3 \pi \left(\frac{x}{2}\right)^2 dx$$

$$2\left(\pi\, \frac{\left(\frac{x}{2}\right)^3}{3} + C\right)\Bigg|_0^3$$

$$2\left[\pi\, \frac{\left(\frac{3}{2}\right)^3}{3}\right] - [0]$$

$$2\left[\frac{\frac{27}{8}\pi}{3}\right]$$

$$2\left(\frac{27}{24}\pi\right) \quad \frac{27}{12}\pi = A$$

7.2 examples 2011-02-04 Pd 3